



Academic year	2014-15
Subject	10269 - Molecular Nutrition
Group	Group 1, 1S
Teaching guide	A
Language	English

## Subject identification

<b>Subject</b>	10269 - Molecular Nutrition
<b>Credits</b>	0.72 de presencials (18 hours) 2.28 de no presencials (57 hours) 3 de totals (75 hours).
<b>Group</b>	Group 1, 1S (Campus Extens)
<b>Teaching period</b>	1st semester
<b>Teaching language</b>	Spanish

## Professors

Lecturers	Horari d'atenció alumnes					
	Starting time	Finishing time	Day	Start date	Finish date	Office
Paula Oliver Vara <a href="mailto:paula.oliver@uib.es">paula.oliver@uib.es</a>	15:00h	16:00h	Wednesday	01/09/2014	31/07/2015	Q.8 del Mateu Ofriola

## Contextualisation

**Teaching staff:** Paula Oliver, PhD in Biochemistry with European Doctor Mention (2000). Associate professor of Biochemistry and Molecular Biology in the UIB. She is a member of the "European NutriGenomics Organisation" (NuGO) and of the Spanish research network of excellence "CIBER of Physiopathology of Obesity and Nutrition" (CIBERObn). She conducts her research in the Laboratory of Molecular Biology, Nutrition and Biotechnology of the UIB. She has two research sections ("sexenios") recognized by the Spanish Ministry of Education and three teaching sections ("quinquenios") recognized by the UIB.

**Subject:** The subject is aimed to complement the knowledge of 'classic' nutrition, looking at nutrients as regulators of gene expression, involved in metabolic control, and able to affect the whole organism.

## Requirements

For a proper understanding of the subject, students must have previous knowledge on Molecular Biology.

### Essential requirements

Knowledge of Molecular Biology, applicable to gene expression regulation.





## Recommendable

Basic knowledge of Immunology.

## Skills

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### Specific

- \* E1 - To be aware of the molecular bases of the interactions between nutrients with genome and its expression.
- \* E10 - To be aware of the advances in the field of Nutrigenomics, Personalized Nutrition and Molecular Nutrition, and obtain the skills necessary to be constantly updated.
- \* E2 - To be aware of the relation between nutrition, health and pathologies.
- \* E3 - To apply the knowledge of the discipline to health promotion.

### Generic

- \* G1 - Ability to apply logical and creative thinking in the work.
- \* G10 - Ability to articulate knowledge in oral and written presentations.
- \* G12 - Ability to develop the work in English (scientific language internationally recognized in the discipline).
- \* G6 - Ability to work inter-disciplinary.
- \* CB9 - To know how to communicate conclusions and knowledge and reason which support them to specialized and non-specialized audience clearly and without ambiguity.
- \* CB10 - To possess learning skills that allow to continue studying mainly in an autodirected or autonomous manner..
- \* CB6 - To possess and understand knowledge which provide a basis or opportunity to be innovative in the development and/or application of ideas, often in a research context.
- \* G9 - Ability to collect, organize and critically analyze research and professional bibliography of the discipline.
- \* G4 - Ability to formulate hypothesis and to design proper studies to verify them.

### Basic

- \* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: [http://estudis.uib.cat/master/comp\\_basiques/](http://estudis.uib.cat/master/comp_basiques/)

## Content

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The subject is divided in seven topics, their contents are detailed below.

### Theme content

#### Topic 1. Introduction to Molecular Nutrition

- \* Concept of Molecular Nutrition opposed to 'classic' concept of Nutrition.
- \* Gene regulation and nutrient-gene interaction.
- \* Types of regulation by nutrient.
- \* Problems in the study of regulation by nutrients.



- \* Research methods in Molecular Nutrition: application of genomic and post-genomic technologies.

Topic 2. Effects of nutrients on proliferation, differentiation and apoptosis

- \* Nutritional regulation of cell proliferation and differentiation.
- \* Nutrients and apoptosis.
- \* Specific example: nutritional regulation of gene expression in the intestinal epithelium and the physiological importance of said regulation.

Topic 3. Role of nutrients and derivatives on gene expression and signal transduction

- \* Regulation of gene expression by carbohydrates: effects on rate of transcription, processing and stability of mRNA in glycolytic and lipogenic metabolism.
- \* Regulation of gene expression by fats: effects on lipogenic enzymes and other proteins.
- \* Regulation of gene expression by amino acids: inhibition of growth by protein malnutrition.
- \* Regulation of gene expression by vitamins: vitamin A and vitamin D.
- \* Regulation of gene expression by minerals: post-transcriptional regulation by iron.

Topic 4. Immuno-nutrition

- \* Malnutrition and immune function.
- \* Obesity and immune system: role of leptin.
- \* Nutrients and immunity: essential amino acids, omega-3 fatty acids, vitamins and minerals.
- \* Examples of specific nutrients.

Topic 5. Food allergies and food intolerances

- \* The role of mucous in the defence system: intestinal flora.
- \* Prebiotic and probiotic food.
- \* The intestinal immune system: intestinal barrier and its functions, the intestine as effector in inflammatory reactions.
- \* Control of absorption of antigens in the intestine.
- \* Oral tolerance and allergic sensitivity.
- \* Immunological reactions (allergies) and non-immunological reactions (intolerances) to foods.
- \* Causes, pathogenesis and symptoms of food allergies and intolerances. Allergens.

## Teaching methodology

The teaching methodology that will be followed in the subject is listed below.

## Workload

The workload estimate in the subject is listed below.

## In-class work activities

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Theoretical presental classes	Large group (G)	The list of topics will be developed in expositive and participative classes.	10

Academic year	2014-15
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Modality	Name	Typ. Grp.	Description	Hours
ECTS tutorials	Tutorials for the control and follow up of the research project	Small group (P)	<p>Tutorials will be carried out out to assess to the groups of students in the choice of a topic for the development of a hypothetical research project related with the subject, and also for the correct design of the written project.</p> <p>Tutorials will be also developed to solve any doubt related with the theoretical classes or with any other content of the subject.</p>	3
Other	Presentation of research projects	Large group (G)	The students will present and defend a hypothetical research project on Molecular Nutrition.	5

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Campus Extens platform.

#### Distance education work activities

Modality	Name	Description	Hours
Individual self-study	Solution of a questionnaire	The student will work individually to answer a questionnaire on the contents explained in the theoretical classes.	15
Group or individual self-study	Preparation of a hypothetical research project on Molecular Nutrition	<p>The student, working individually or in group (recommended), will identify a topic related with the subject and will prepare a proposal for a hypothetical request of research project. The proposal will be based on a bibliographic research.</p> <p>The final document will consist of the following parts:</p> <ul style="list-style-type: none"> <li>* Title of the project.</li> <li>* Responsible researchers (enclosing the Curriculum vitae of the participants according to the format of the CICYT.</li> <li>* Background (specifying: the problematic of the selected topic and its relevance, state of the art (activities previously developed till and obtained results)</li> <li>* Specific objectives</li> <li>* Proposed activities</li> <li>* Methodology</li> <li>* Recapitulation (with the expected results and their expected impact)</li> <li>* Calendar</li> <li>* Budget (optional, it can include: equipments, laboratory materials and reagents, personnel expenses, travels and diets)</li> </ul> <p>The delivery of the project (written version) will be together to its presentation and defence to the teacher.</p>	42



### Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

### Student learning assessment

Assessment will take into account students' learning, relating this to subject-specific skills, and students' ability to develop, communicate and use this knowledge.

The evaluation will be as follows:

- \* Delivery of a questionnaire on concepts acquired in class (20%).
- \* Delivery and defence of a hypothetical project on Molecular Nutrition (70% written work and 10% la presentation).

#### Tutorials for the control and follow up of the research project

Modality	ECTS tutorials
Technique	Attitude scales ( <b>retrievable</b> )
Description	Tutorials will be carried out out to assess to the groups of students in the choice of a topic for the development of a hypothetical research project related with the subject, and also for the correct design of the written project. Tutorials will be also developed to solve any doubt related with the theoretical classes or with any other content of the subject.
Assessment criteria	Tutorial classes constitute an important part of the subject, and they are necessary to develop a good research project. Even they have no specific value on the final mark, the attitude and interest showed by the students in the tutorials will be taken into account when defining the final mark of the subject.

Final grade percentage: 0%

#### Presentation of research projects

Modality	Other
Technique	Papers and projects ( <b>retrievable</b> )
Description	The students will present and defend a hypothetical research project on Molecular Nutrition.
Assessment criteria	The oral presentation of the project will be evaluated, as well as its defence and the answers to the questions made by the teacher.

Final grade percentage: 10%





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### Solution of a questionnaire

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Modality	Individual self-study
Technique	Extended-response, discursive examinations ( <b>retrievable</b> )
Description	The student will work individually to answer a questionnaire on the contents explained in the theoretical classes.
Assessment criteria	In the solution of the questionnaire it will be taken into account the assimilation of the knowledge explained in class, as well as the capacity of the students to look for additional information if they consider that it is necessary to answer to the questionnaire.

Final grade percentage: 20%

### Preparation of a hypothetical research project on Molecular Nutrition

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Modality	Group or individual self-study
Technique	Papers and projects ( <b>retrievable</b> )
Description	The student, working individually or in group (recommended), will identify a topic related with the subject and will prepare a proposal for a hypothetical request of research project. The proposal will be based on a bibliographic research. The final document will consist of the following parts: * Title of the project.* Responsible researchers (enclosing the Curriculum vitae of the participants according to the format of the CICYT.* Background (specifying: the problematic of the selected topic and its relevance, state of the art (activities previously developed till and obtained results)* Specific objectives* Proposed activities* Methodology* Recapitulation (with the expected results and their expected impact)* Calendar* Budget (optional, it can include: equipments, laboratory materials and reagents, personnel expenses, travels and diets) The delivery of the project (written version) will be together to its presentation and defence to the teacher.
Assessment criteria	The following aspects will be positively valued: <ul style="list-style-type: none"><li>* The work of compilation, organization and the presentation of the project.</li><li>* The viability of the project and the relevance of the proposed objectives.</li><li>* The adjustment of the proposed activities to the duration of the project.</li><li>* The scientific profitability and the applicability of the expected results.</li></ul>

Final grade percentage: 70% with minimum grade 5

### Resources, bibliography and additional documentation

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#### Basic bibliography

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Given the short history of the field and the nature of the subject, there is no available textbook. Bibliography is scattered through books and research articles. Students will use Internet searchers and general bibliography data bases, mainly *PubMed*.

#### Other resources

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PubMed (<http://www.ncbi.nlm.nih.gov/sites/entrez>)

